



## Special issue on *Tuta absoluta*: recent advances in management methods against the background of an ongoing worldwide invasion

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Invasive arthropod pests hold great socio-economic and ecological importance, in the current global agricultural scenario (Paini et al. 2016). A recent estimate of the economic costs associated to invasive insects accounts to 70 billion US\$ per year globally, with associated health costs exceeding 6.9 billion US\$ per year (Bradshaw et al. 2016). In the past two centuries, the first records of invasive pests increased drastically, and about one-third of these happened in the past 40 years mostly likely due to the highly intensified human-mediated intercontinental exchanges (Seebens et al. 2017) and due to global warming (Bellard et al. 2013). In this context, Journal of Pest Science has focused most of its editorial efforts for attracting major contributions on the biology, ecology and possibilities of sustainable control of invasive pests. To this aim, various special article collections have been published on invasive insect pests, such as those attacking stored products (Athanassiou 2012) and forests and urban trees (Sweeney et al. 2019), the brown marmorated stink bug (Haye and Weber 2017), the spotted wing drosophila (Asplen et al. 2015; Biondi et al. 2016) and wireworms (Traugott et al. 2013).

This special issue aims at bringing together the most recent researches on the South American tomato pinworm, *Tuta absoluta* (Meyrick) (Lepidoptera: Gelechiidae) (Fig. 1). This moth is well known for causing drastic tomato yield losses owing to its leaf-mining activity and through occasional fruit infestation (Biondi et al. 2018; Desneux et al. 2010). Its ability to successfully develop on several crop and weed solanaceous species, as well as on non-solanaceous plants in lesser extent, makes its presence in tomato crops very challenging to avoid (Biondi et al. 2018; Campos et al.

2017). In 2006, *T. absoluta* was detected in Spain, for the first time outside of its native range (South America). It rapidly spread across European and North African countries (Desneux et al. 2011) before colonizing most of the Asian (Han et al. 2019a) and African (Mansour et al. 2018) continents. Two major tomato-producing countries yet to be invaded, i.e. the USA (Tabuloc et al. 2019) and China (Xian et al. 2017), are currently threatened by the pest presence in the Caribbean (Verheggen and Fontus 2019) and in countries bordering China (Sankarganesh et al. 2017; Han et al. 2018), respectively. Its invasion in large cropping tomato areas resulted in large environmental and economic issues mainly linked with yield losses and widespread use of broad-spectrum insecticides (Desneux et al. 2011). Following the *T. absoluta* arrival in European countries, various integrated pest management packages mainly based on monitoring, biological control and use of selective insecticides have been developed and implemented (Biondi et al. 2018).

We provided several original research articles reporting new findings on the biology and populations dynamics of *T. absoluta*, its chemical and trophic ecology, as well as a range of novel control tactics including molecular and biological control agents. Three review papers comprehensively covered the topics of *T. absoluta* insecticide resistance status and management (Guedes et al. 2019), the pest current status in the Asian continent (Han et al. 2019a), the implications for *T. absoluta* management of irrigation, fertilization and plant resistance (Han et al. 2019b), and Salas Gervassio et al. (2019) provided a comprehensive inventory of the available knowledge on *T. absoluta* parasitoids in its native area.

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**Fig. 1** Tomato leaflet with mines caused by *Tuta absoluta* larvae (left), tomato fruit infested by *T. absoluta* larvae (center), *T. absoluta* adult on tomato a leaf (right). Photograph credit: Antonio Biondi

## Compliance with ethical standards

**Conflict of interest** The authors declare that they have no conflict of interest.

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